

Remarks

In this paper, claim 15 amended to correct antecedent basis. Claims 2-7 and 15 are pending. Reconsideration of the claims, as amended, is requested.

Claims 15 and 2-5 were rejected under 35 U.S.C. 102(b) as anticipated by Robertson et al. (U.S. Patent No. 5,487,378). Claims 6 and 7 were rejected under 35 U.S.C. 103(a) as unpatentable over Robertson et al. Applicant disagrees with both of these rejections. Robertson et al. does not disclose, teach or suggest a device as recited by the pending claims, nor would one skilled in the art be led to the device of the pending claims.

Robertson et al. discloses an inhaler device for dispensing droplets of liquid medicament to a patient. The device includes an aerosol generator, shown in Figs. 4a and 4b. In these figures, the aerosol generator is shown having a vibrator element (54) attached to a disc (52) around a mounting rim (68) of disc (52). The vibrator element (54) includes a brass disc electrode (53) onto which is bonded a smaller disc of piezo-electric material (56). One or more electrodes (58) and (60) are formed on the piezo-electric material (56), and lead wires (62) are connected to these electrodes (58), (60) and to the disc electrode (53). When an electric field is applied between these electrodes, the vibrator element (54) bends and may be excited into mechanical resonance by application of alternating voltage at appropriate frequency (see col. 10, lines 32-49).

From this passage, it is unambiguously clear that Robertson et al. teaches an aerosol generator where the vibrator element (54) bends when an alternating voltage is applied at an appropriate frequency. What Robertson et al. does not disclose or suggest is a device having a membrane that is bent or oscillated by a vibration generator.

The Office Action states that the nozzle array (50), as shown in Figs. 5a and 5b and also in Figs. 4a and 4b, can be considered a membrane. The Office Action defines a membrane as a thin sheet of material that is permeable to substance in solution, and thus, nozzle array (50) is a membrane. Applicant disagrees with this. Nozzle array (50) is formed by a plurality of nozzles, each which has an orifice in the range of 2 to 50 μm , or, 5 to 10 μm (see col. 2, lines 54-55, col. 3, lines 15-19, and col. 10, line 67). Column 3,

lines 31-46 discuss forming of preferred nozzle arrays. Figs. 5a and 5b show cross-sections of a silicon nozzle array and an electroformed nickel nozzle array, respectively. A membrane can be defined as "a thin soft pliable sheet or layer" (Webster's Ninth New Collegiate Dictionary). These nozzle arrays (50) are not membranes.

Even on the assumption that nozzle array (50) of Robertson et al. corresponds to a membrane, it is quite clear that in the device of Robertson et al., particularly when referring to Figs. 4a and 4b, the nozzle array (50) is not caused to vibrate since Robertson et al. has the vibrator element bending when an alternating voltage is applied at an appropriate frequency, not the nozzle array. Further, Robertson et al. clearly states that "the ultrasonic vibrations are transferred into the liquid (16) and around the rim of the vibrator element into the disc (52) by motion of the vibrator element (54). These effects result in ultrasonic pressure pulses within the liquid (16) behind the nozzle array (50) and droplets (72) are formed as the liquid (16) is periodically ejected through the nozzle array (50)" (see col. 10, lines 57-64). What Robertson et al. does is vibrate the vibrator element (54), which in turn creates pressure pulses within liquid (16), which force liquid (16) through the nozzles of nozzle array (50). Nozzle array (50) does not vibrate or oscillate.

In the Office Action, it is stated that Robertson et al. refers to an apparatus comprising vibrating means operable to vibrate a perforate membrane to dispense droplets of liquid through the membrane. This discussion within Robertson et al. is of GB 2240494A, the prior art of Robertson et al., which is a different device having a very different structure and operation principle than the device shown in Figs. 4a and 4b of Robertson et al. Robertson et al. provides an improvement over GB 2240494. Robertson et al. teaches away from the GB reference, and there is no reason why one reading Robertson et al. would progress back to the prior art.

Yet another difference between Robertson et al. and the pending claims is that the pending claims include the recitation that the membrane oscillates in an audible frequency range so as to emit an audible signal for a user. It has been established above the Robertson et al. does not have a membrane that oscillates. Even more, Robertson et al. does not provide an audible signal caused by the oscillation of the membrane.

Applicant acknowledges that Robertson et al. provides the generation of an audible signal, for example, as indicated by block 160 of FIG. 10. However, as explained at column 14, lines 33-34, it is the vibrator element (54) that generates the audible signal, not the membrane, and also not the nozzle array. This is in line with other passages of Robertson et al., such as column 11, lines 41-60, where it mentioned that the vibrator element (54) is an audio sounder.

Further, Applicant contends that one of average skill in the art would not have used the membrane of an aerosol generator to generate an audible signal, since the membrane driven by the vibration generator is the most delicate part of the device. The vibrating membrane is the source of the therapeutic aerosol, which has to be supplied to a patient with an exact dose.

In summary, the principles used in the Robertson et al. device are very different from those of the claims of the pending application. For example, the bending vibrator element of Robertson et al. transfers ultrasonic vibrations into the liquid, resulting in ultrasonic pressure pulses within the liquid behind the nozzle array such that droplets are formed as the liquid is periodically ejected through the nozzle array at ultrasonic frequencies (see col. 10, lines 53-64). The claims of the pending application require that the membrane oscillates such that a liquid is nebulised through the membrane. Further, the vibrator element of Robertson et al. generates an audible signal, whereas the claims of the pending application require that the oscillating membrane emits an audible signal.

Applicant contends that at least for these reasons, the pending claims are neither anticipated by nor obvious over Robertson et al., and requests that the rejections be withdrawn.

SUMMARY

In consideration of the above amendments and remarks, Applicants respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

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Respectfully submitted,

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